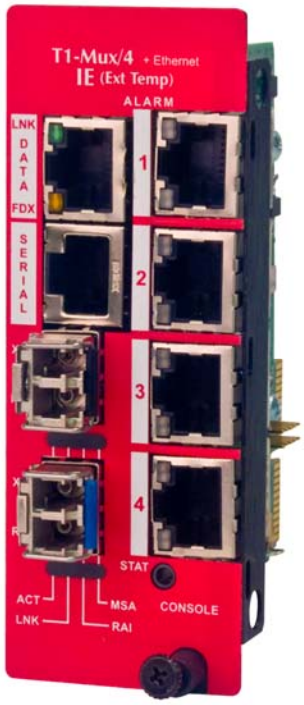
IE-iMcV-T1-Mux/4 + Ethernet

Operation Manual



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This equipment has been tested and found to comply with the limits for a Class A computing device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which the user will be required to correct the interference at his own expense.

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About the IE-iMcV-T1-Mux/4 + Ethernet

Overview

The IE-iMcV-T1-Mux/4 + Ethernet is a media converter that transports four independent T1 lines over an existing single (or dual, "1+1") standard fiber optic line operating at an effective rate of 155Mbps. One serial link (RS-232) and one Ethernet (10/100BaseT) connection are also multiplexed onto the fiber link(s). Each of these communication channels is transported end-to-end at full wire speed with very low latency. A maximum packet size of up to 1916 bytes is supported on the Ethernet port.

The serial link can be used for extending an independent RS-232 interface to the remote POP location for use in managing or controlling other devices at the POP and supports any data rate up to 120Kbps. In addition, each unit also supports an RS-232 console port for local configuration by technical support personnel. The console port is used for end-to-end system management, fault detection/isolation and system diagnostics.

The IE-iMcV-T1-Mux/4 + Ethernet provides fault indications on the T1 and fiber links resulting from real-time active faults. The equipment detects both T1 and fiber LOS events as well as degraded T1 or fiber lines. The unit will automatically forward AIS signaling to the remote unit after detecting an *LOS* (Loss Of Signal) condition on any incoming T1 line. Severe receive optical link failures will result in the automatic generation of *AIS* signaling onto the T1 lines connected to the unit receiving the corrupted optical signal.

In addition, Code Violation (CV) errors are detected on all incoming T1 lines and *BER* calculations for the optical line are constantly being performed by circuitry within the unit's optical receiver. Error conditions are displayed on the unit's front panel *LED* indicators and reported to system management software (if equipped) where more detailed error information can be displayed on the user's Graphical User Interface (GUI).

Modules equipped with *1+1* fiber redundancy can benefit from the enhanced reliability of a protected fiber link and the system's ability to automatically switch to the "best" fiber line should one line become impaired or fail. This automatic switchover capability is designed to occur rapidly (<50 milliseconds), minimizing data loss and system down time. In addition, automatic switchover can be overridden; this allows the end-user to force the unit to receive on a specific optical line if desired to support periodic maintenance.

The IE-iMcV-T1-Mux/4 + Ethernet offers the following features:

- Four T1 ports with RJ-48 connectors
- One full bandwidth Ethernet 10/100BaseT port (specific model)
- 1+1 protection switching via two SFP-based optical ports (specific model)
- DDMI supported on SFP ports
- One end-to-end serial RS-232 port on an RJ-45 connector, supporting up to 120K baud rate
- Local CLI management console port on a Mini Jack connector
- Remote management capability through iMediaChassis series with SNMP Management
- AIS generation on signal loss on all T1 interfaces
- SNMP Alarm TRAP reporting in managed chassis
- AutoCross for the Ethernet port
- Last Gasp on remote power loss
- Supports all MSA-compliant SFPs, 155mpbs
- Link Fault Pass-Through (LFPT)
- Bandwidth control, 10/100 Frc/Adv, Flow Control, FXLL

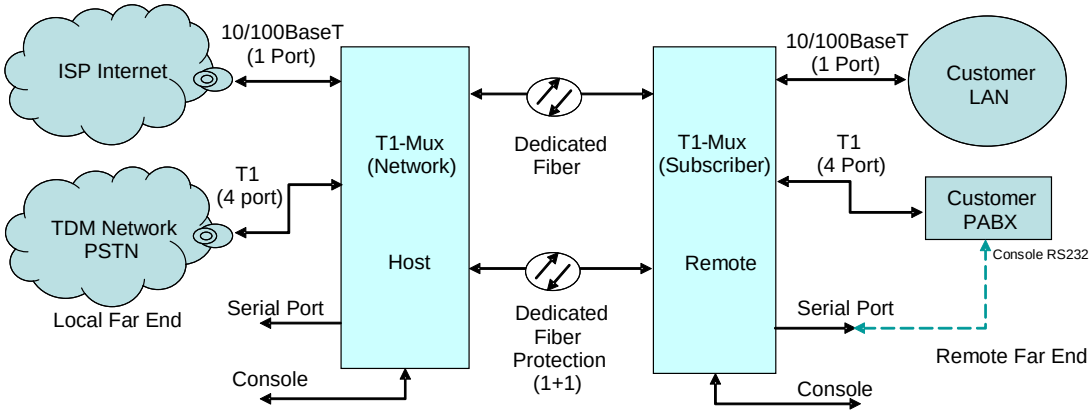
The IE-iMcV-T1-Mux/4 + Ethernet module is a dual-wide iMcV module.

Compatible chassis include the following:

- iMediaChassis series
- MediaChassis series (2 slot models)
- IE-MediaChassis series (2 slot models)

Product Application

The IE-iMcV-T1-Mux/4 + Ethernet delivers 4 T1 lines to a customer's site over a protected, dedicated fiber line. In addition, one serial RS-232 line and one 10/100BaseT Ethernet line can be carried at the same time. All configurations run at full line rates with no interaction.



Managed Modules

The IE-iMcV-T1-Mux/4 + Ethernet modules are installed as a Host/Remote pair; the fiber connection is IMC proprietary. Host or Remote configuration is selected by an onboard DIP Switch setting. The Host/Remote pair can be remotely managed when the HOST is installed in an iMediaChassis with an SNMP Management Module.

Configuration Control

Some iMcV-Modules offer Configuration Control; labels on the front faceplate are identified as such. Configuration Control has been implemented to assist the end user by retaining the latest configuration regardless of how that configuration was implemented (via DIP Switch settings or SNMP), when an SNMP Management Module is present in a managed chassis.

Historically, if an SNMP Management Module was installed in a chassis, SNMP would override the DIP Switch settings of a module. Utilizing Configuration Control, the end user has three conditions under which the configuration of an iMcV-Module may be impacted:

- Changing or installing an SNMP Management Module into a chassis with an IE-iMcV-T1-Mux/4 + Ethernet populated in a chassis
  - The IE-iMcV-T1-Mux/4 + Ethernet will transfer its saved configurations to the SNMP Management Module. If there is no SNMP Management Module, the IE-iMcV-T1-Mux/4 + Ethernet will function based on its DIP Switch settings. If the DIP Switches have not been changed, the stored

configuration on the unit will be used. The stored configuration can be retrieved from the SNMP Management Module or the DIP Switches.

- Replacing the same type of iMcV-Module
  - If the DIP Switch settings are the same as the settings on the removed IE-iMcV-T1-Mux/4 + Ethernet, the new IE-iMcV-T1-Mux/4 + Ethernet gets its configuration settings from the SNMP Management Module.
  - If the DIP Switch settings are different, then the configuration of the module is determined by the DIP Switch settings. (The settings are forwarded to the SNMP Management Module and the values are saved.)
- Installing a different model of an iMcV-Module
  - If another type of module is installed into the same slot in a chassis, the SNMP Management Module clears the memory of the previous configuration for that slot; the installed iMcV-Module configures itself and its configuration is forwarded to the SNMP Management Module, where the values are saved.

The SNMP Write Lock switch does not impact any iMcV-Module or IE-iMcV-Module with Configuration Control. Removing and installing a new SNMP Management Module will no longer impact these modules, either. However, if there is a mixture of iMcV-Modules with and without Configuration Control, the Write Lock Switch and a new SNMP Management Module must be taken into consideration.

If the command cleandb is applied to an SNMP Management Module, all the settings for the modules will be removed, but the Configuration Control modules will still be based on the last change made. Those without Configuration Control will be set to their default settings.

NOTE
If the end user has a mixture of standard iMcV-Modules as well as Configuration Control iMcV-Modules, it is important to understand how SNMP and DIP Switches will impact the cards depending on their capability. Standard iMcV-Modules cannot be upgraded to Configuration Control capability, so it is strongly recommended to set the DIP Switches on the modules and then configure them via software to match the same settings.

1+1 Protection on the Fiber Interface mode

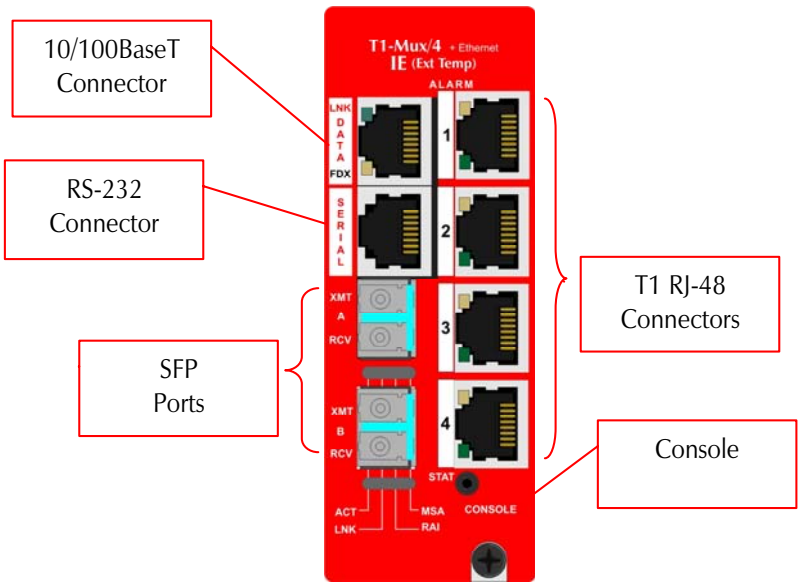
The fiber transport is a 1+1 protection switched transport. It provides very fast (<50 mSec) switch-to-protect timing by transmitting the same information on both fibers at the same time. The fiber receiver then chooses the fiber to receive based on the validity of the line. Once the selection is made, the receiver will stay on that fiber line until it enters a fiber defect state at which time another fiber selection process is started (non-revertive switching). Once a switch-to-protect has occurred, a hold off time (1 second minimum) is used to prevent another switch-to-protect from occurring too soon after a protection switch.

If protection is not enabled, SFP port A will be used by default and no alarm or defect information will be provided for SFP port B. The LEDs associated with the backup fiber line will only be active if protection is enabled.

When protection is enabled, error reporting for the backup fiber line is limited to the Signal LOS condition. Signal LOS will generate an SFP Down trap.

A Remote Alarm Indication (RAI-F) signal is sent back to the fiber if the received fiber is in BER or LOS defect condition. In this way the far end unit is alerted of a fault condition on the local fiber line.

Serial Port Connection



The IE-iMcV-T1-Mux/4 + Ethernet includes a console serial port. To establish a link between a module's console port and a local PC, connect the Mini Jack to DB9 adapter (optional accessory available through IMC Networks, part number 825-39950). This RS-232 serial connection provides access to the IE-iMcV-T1-Mux/4 + Ethernet module *CLI* configuration screens. Set the computer/terminal for **VT-100 emulation**, **38.4K baud**, **8 data bits**, **1 stop bit**, **no parity** and **no flow control**. Under the VT-100 emulation, set the backspace key to send delete.

iView² Management Software

iView² is the IMC Networks management software designed specifically for the IMC Networks "iMcV" family of modules. It features a *GUI* and gives network managers the ability to monitor and control the manageable IMC Networks products.

iView² is available in several versions, including WebServer version 3.0, and can also function as a snap-in module for HP OpenView Network Node Manager and other third party SNMP Management software. For assistance in selecting the right version of iView² for your operating system, please visit:
http://www.imcnetworks.com/products/iview2.cfm

iView² supports the following platforms:

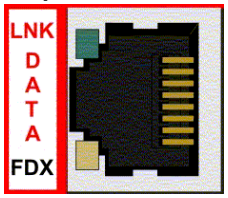
- Windows 2000
- Windows XP
- Windows Vista
- Windows 7

Please see the *SNMP* Management Module for software configuration options.

LED Operation

The IE-iMcV-T1-Mux/4 + Ethernet features diagnostic *LED*s as explained below.

10/100BaseT Connector



LNK:

- OFF when port is not linked/connected
- Glows green when link is established
- Blinks green during data activity

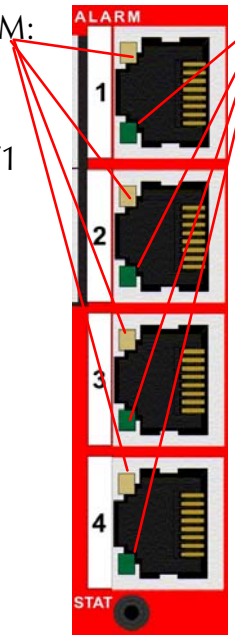
FDX:

- OFF when port is not connected or when running at half-duplex
- Glows yellow when port is running at full duplex
- Blinks yellow when collisions occur

T1 RJ-48 Connectors

ALARM:

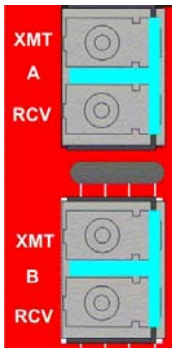
- OFF during normal operation
- Blinks red+green simultaneously when CV errors detected on the T1 line
- Glows red+green when loss of service (LOS) is detected, OR continuous bit errors are detected on the T1 line at far end of the optical line
- Blinks red when local CV errors detected on T1 line.
- Glows red when LOS detected on the local T1 line, OR when continuous errors are detected on the local T1 line



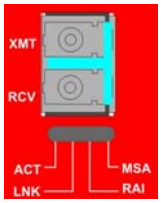
STAT:

- Off if not equipped
- Glows green during normal operation
- Glows red+green when out-of-service or when the port is in a loopback or test state
- Glows red when the Host to Remote fiber link(s) is down or badly corrupted

SFP Ports



or



One model offers two *SFP* (A and B) ports for *1+1* protection; a second model offers one *SFP* without protection.

ACT:

- Glows green when the *SFP* port is the active receive line.
- OFF when the *SFP* is not the receive line
- Glows red+green when the *SFP* port is manually forced to be the active receive line

LNK:

- Glows green when there is a valid link
- Glows red when a loss of optical signal occur, *LOF*, or with continuous optical bit errors

RAI:

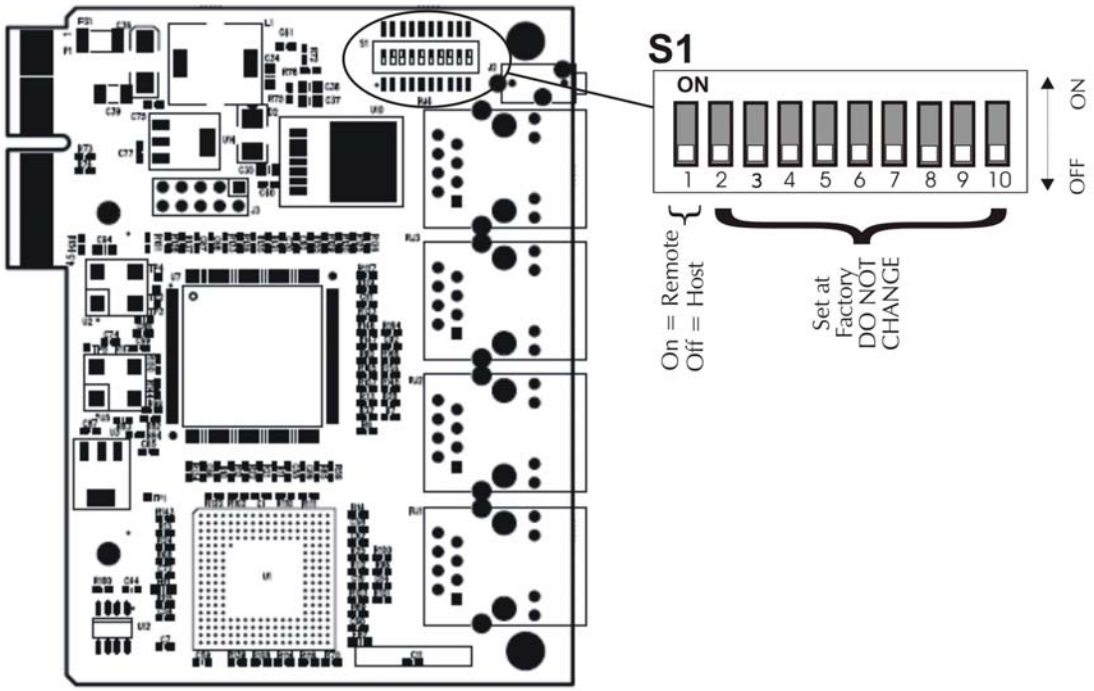
- Off when no remote defects are detected
- Glows red+green when remote *LOS* or *BER* detected

MSA:

- Off when no SFP is installed in the port
- Glows green when no *SFP* alarms are detected
- Glows red+green when *SFP* alarms or defects are detected at remote end
- Glows red when *SFP* alarms or misconfigurations are detected locally, i.e., when the *SFP* is missing, or when *SFP* speed is not at 155Mbps

DIP Switch Assignments

A single 10-position DIP Switch is located on the unit to set the configuration. The switch positions are defined as follows:



Switch #	Function	Settings	Factory Default
1	*Host/Remote*	*OFF = Host, ON = Remote*	*OFF*
2	*Reserved*	*OFF*	*OFF*
3	*Reserved*	*OFF*	*OFF*
4	*Reserved*	*OFF*	*OFF*
5	*Reserved*	*OFF*	*OFF*
6	*Reserved*	*OFF*	*OFF*
7	*Reserved*	*OFF*	*OFF*
8	*Reserved*	*OFF*	*OFF*
9	*Reserved*	*OFF*	*OFF*
10	*Reserved*	*OFF*	*OFF*

NOTE
Switch #1 must be set to ON at the Remote location. *Switches #2 through #10 are reserved for factory use only and must be OFF for proper operation.*

Installation Instructions

Each IE-iMcV-T1-Mux/4 + Ethernet module requires two slots in an iMedia Chassis Series, MediaChassis/2 Series, or IE-MediaChassis/2 series. To install the module in a chassis, remove the blank faceplates covering the slots where the module is to be installed. Then slide the module into the chassis card guides until the module is seated securely in the slots. Secure the module to the chassis by tightening the captive screw.

All IE-iMcV-T1-Mux/4 + Ethernet units are shipped from the factory configured as **Host** units. The IE-iMcV-T1-Mux/4 + Ethernet modules must be installed in pairs. For two IE-iMcV-T1-Mux/4 + Ethernet units to properly operate together one unit needs to be configured as a **Remote**. Configuration as a Host or Remote is controlled via a DIP Switch setting (S1-1).

Small Form-Factor Pluggable Ports (SFP)

The fiber link on the IE-iMcV-T1-Mux/4 + Ethernet module is supported through one or two SFPs (depending on the model) running at 155Mbps. Many SFPs, including those from IMC Networks, feature enhanced diagnostics capabilities Data and Diagnostic Management Information (DDMI). DDMI statistics provide real-time access to transceiver operating parameters such as voltage, temperature, laser bias current, and both transmitted and received optical power. DDMI information can be accessed in iView^2. Any MSA-compliant SFP, 155mbps, can be installed in one or both SFP ports (model specific).

AutoCross Feature

The 10/100BaseT Ethernet port on the IE-iMcV-T1-Mux/4 + Ethernet includes an AutoCross feature that automatically selects between a crossover workstation and a straight-through connection depending on the connected device.

The following sections describe the configurable features.

From the CLI "Unit Configuration," use the "Factory Default" command to restore the unit's default settings in the CLI, under Unit Configuration. This restores the card's default configuration and resets the default username and password.

User: **admin** / Password: **admin**

Ethernet Port

If the Ethernet port is not used, it can be set to disabled via a console session or via iView², to effectively block all traffic on this port.

Packet Size

The Ethernet port can accommodate packets up to 1916 bytes.

Auto Negotiation

The IE-iMcV-T1-Mux/4 + Ethernet ships from the factory with Auto Negotiation enabled on the Ethernet port. In this mode, the port negotiates for speed, duplex and flow control.

Forcing the Speed, Duplex Mode, and Flow Control

The Ethernet port on the IE-iMcV-T1-Mux/4 + Ethernet can be selectively advertised or manually forced for 10 Mbps or 100 Mbps operation at Half- or Full-Duplex (i.e., 10 Mbps Full-Duplex, 10 Mbps Half-Duplex, 100 Mbps Full-Duplex, etc.). Flow control can also be enabled on the Ethernet port when the connecting equipment supports this. These features can be enabled through iView²/CLI.

Bandwidth Control

The IE-iMcV-T1-Mux/4 + Ethernet includes bi-directional bandwidth control in 32 Kbps increments (configurable via iView2).

FX LinkLoss and *LFPT*

During normal operation, link integrity pulses are transmitted by all point-to-point Ethernet devices. When an IE-iMcV-T1-Mux/4 + Ethernet receives valid link pulses, it knows that the device to which it is connected is up, and that the cable coming from that device is intact. The appropriate “LNK” (link) *LED* is lit to indicate this. However, these signals are not normally transmitted across a normal store and forward Ethernet bridge function. A failed Ethernet line on one end of the fiber link is not forwarded to the Ethernet port at the other end of the optical transport. A failed optical line is also not normally forwarded to the Ethernet port. The FX LinkLoss and LFPT functions are used to enable these features.

Both the LinkLoss and LFPT features are set to "Disabled" by default.

FX LinkLoss (FXLL)

FX LinkLoss is a link integrity monitoring feature that forwards fiber link faults to the RJ-45 DATA port to indicate that a fiber link fault has occurred. FX LinkLoss can be enabled in iView²/CLI.

Fiber Fault Loopback (FFL)

When a Fiber LOS is detected, the unit sends a Remote Alarm Indication) back to the fiber in the opposite direction. The reception of fault indication on the fiber line inhibits sending a LINK signal to the Ethernet port. This function can be enabled at both ends of the fiber line without causing a "lock-up" condition and will automatically clear when the fault is cleared. FFL can be configured at both ends of the fiber line with no lock-up condition.

Last Gasp

The iMcV-FiberLinX-II includes a Last Gasp feature, which sends a trap Flinx Unit Down for the Host unit or a Flinx Remote Unit Down for the Remote unit (as seen in iView[2]) when the power to the module fails.

T1 Ports

Alarm Level

T1 lines are defined as LOST when no signal is received as defined by ITU G.775 specifications Loss Of Signal (*LOS)*, and are considered in error with a *BER* of 10^-6. If either of these conditions lasts for more than 2.5 seconds, an ALARM state is declared. This error condition must be absent for 10 seconds for the alarm state to clear.

The starting and ending event of all alarm conditions will generate an *SNMP* TRAP when the unit is installed in a managed chassis and set to the in service state. During initial installation or normal maintenance, the end-user can place the unit in the Out-Of-Service (*OOS)* state to inhibit unwanted *SNMP* TRAP alarms.

Alarm Conditions

- Last gasp (remote lost power)
- T1 Port Up
- T1 Port LOS
- Fiber port Up / LOS
- SFP removed/installed
- Service state change

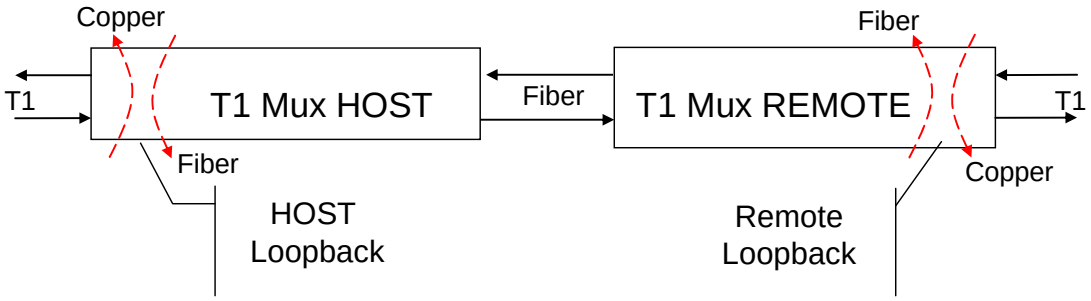
Loopback

Each T1 port can be tested in loopback mode by enabling either a Host loopback or Remote loopback test path. This capability allows the end-user to help troubleshoot and isolate system problems such as improper/broken line terminations, cables or malfunctioning equipment.

With Host loopback, the T1 copper port, connected to the Host unit, is looped back to that port within the local unit. T1 data coming from the remote unit to that port over the optical link is also looped back to the remote unit at the same point within the local unit.

With remote loopback, an T1 line connected to the Host unit is transported onto the optical link and looped back within the remote unit back onto the optical link without passing onto the copper T1 line of the remote unit. The remote's incoming T1 copper line is also looped-back to the copper line within the remote unit.

The default value for loopback is "none."

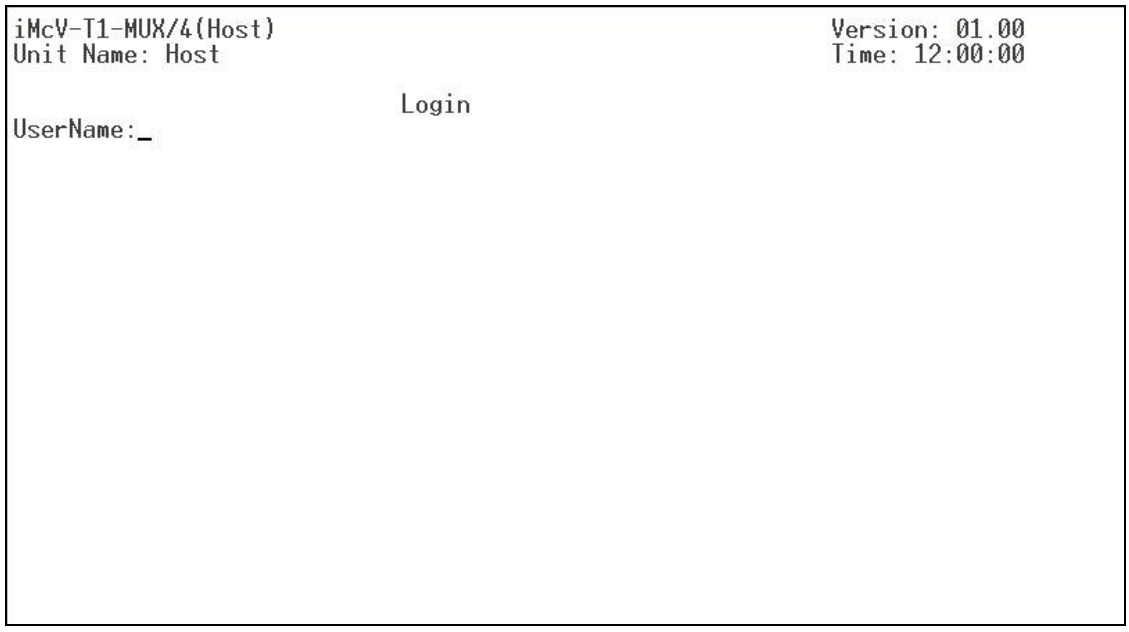


Configuration Using the Console Port

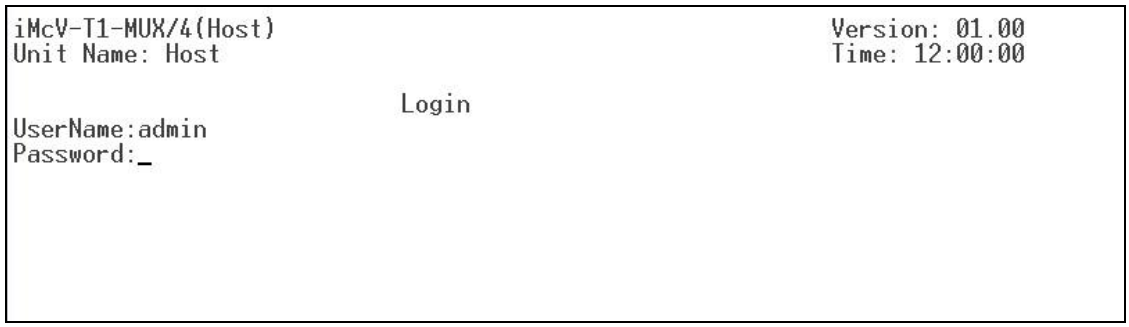
The following section describes configuration using the console screens. The Remote module is only configured through the Host.

Login Screen

After running through an initial self test, the log-in screen is displayed (the diagnostic information displayed below is for illustration purposes only and may differ from the actual screen display):



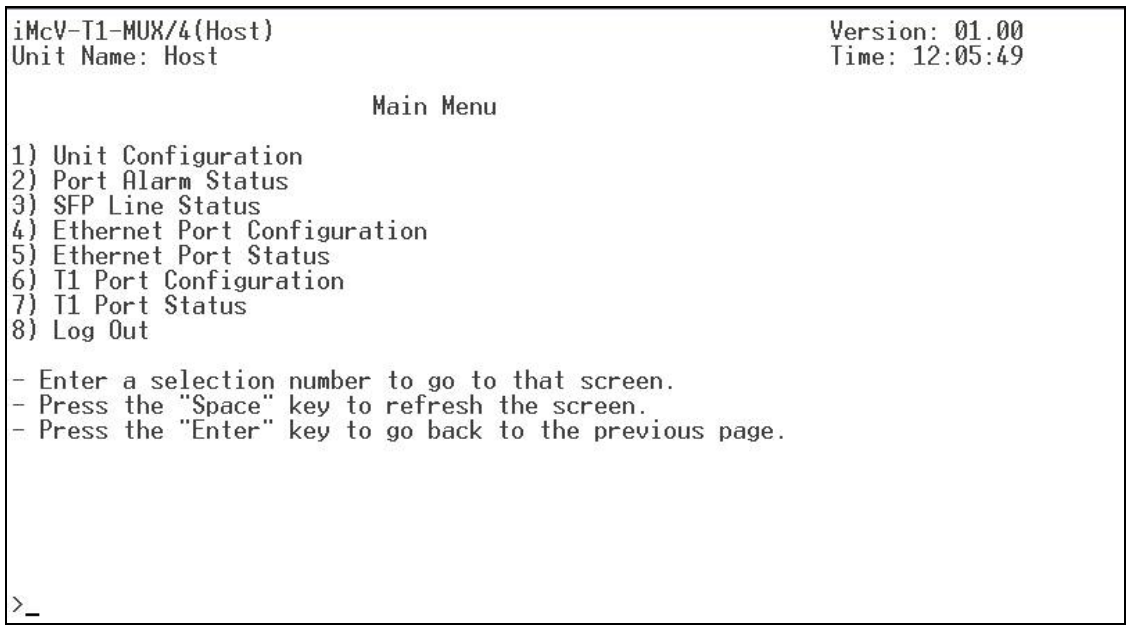
The username is case sensitive with a maximum length of 16 characters. After a username is entered, the system prompts the end-user for a password. Note that the default user name and the default password is *admin*.



Password is case sensitive with a maximum length of 16 characters. After the system validates the username and password, the Main Menu is displayed.

Main Menu

From the main menu, the end-user can view essential unit configuration data and a clock indicating when the displayed information was last refreshed.


iMcV-T1-MUX/4(Host)
Version: 01.00
Unit Name: Host
Time: 12:05:49
Main Menu
1) Unit Configuration
2) Port Alarm Status
3) SFP Line Status
4) Ethernet Port Configuration
5) Ethernet Port Status
6) T1 Port Configuration
7) T1 Port Status
8) Log Out
- Enter a selection number to go to that screen.
- Press the "Space" key to refresh the screen.
- Press the "Enter" key to go back to the previous page.
>_

Menu Options

1 = Refer to the **Unit Configuration Screen**
2 = Refer to the **Port Alarm Status** screen
3 = Refer to the ***SFP* Line Status** screen; *SFP DDMI* alarms are also displayed
4 = Refer to the **Ethernet Port Configuration** screen
5 = Refer to the **Ethernet Port Status** screen
6 = Refer to the **T1 Port Configuration** screen
7 = Refer to the **T1 Port Status** screen
8 = Logout

NOTE
On all configuration screens, the title is the same as the "option" selected from the previous screen.

Unit Configuration Screen

The unit configuration screen displays the names of the Host and Remote units as well as the service state, whether fiber protection is enabled and the SFP *BER* alarm level. In addition, the unit time can be set from this screen and the username and password can be set/reset.

```
iMcV-T1-MUX/4(Host)                                    Version: 01.00
Unit Name: Host                                        Time: 12:06:37

                    Unit Configuration

1) Unit Name Host:       Host
2) Unit Name Remote:     Remote
3) Unit Service State:   Out-Of-Service
4) SFP Fiber Protection: Enabled
5) Set BER Alarm level:  10^-3
6) Set Unit time (24HR): 12:06:37
7) Set User Name/Password
8) Set Factory Default

- Enter a selection number to go to that screen.
- Press the "Space" key to refresh the screen.
- Press the "Enter" key to go back to the previous page.




>
```

The screen displays the current status for items 1 through 8. For security reasons, the current username and password are not displayed.

For items 1 through 8, enter the number of the menu item to be changed, and then enter the new value when prompted. The unit and port names can be assigned by the end-user and are used in *SNMP* associated TRAP alarm messages.

Port Alarm Status Screen

The Port Alarm Status screen displays the status of the Host and Remote alarms on each of the unit's ports. This screen can be refreshed as needed to display current data.

```
iMcV-T1-MUX/4(Host)                                    Version: 01.00
Unit Name: Host                                        Time: 12:07:24

                      Port Alarm Status


                    Host Alarms          Remote Alarms
                  ----------------     ----------------
                  LOS    BER    AIS    LOS    BER    AIS
Active SFP Port:   N      N           N      N
T1Port 1:          Y      N      N    Y      N      N
T1Port 2:          Y      N      N    Y      N      N
T1Port 3:          Y      N      N    Y      N      N
T1Port 4:          Y      N      N    Y      N      N


                Link Up                Link Up
Ethernet:          N                      N

- Press the "Space" key to refresh the screen.
- Press the "Enter" key to go back to the previous page.


>_
```

SFP Line Status Screen

The *SFP* Line Status screen displays the status of the Host and Remote *SFP* links.

```
iMcV-T1-MUX/4(Host)                                          Version: 01.00
Unit Name: Host                                              Time: 12:08:02

                    SFP Line Status LEDs


              HOST                      REMOTE

           ----------------------   ----------------------
           Active    Link    MSA   Active    Link    MSA
1) SFP A:   G         G       G     G         G       G
2) SFP B:                     R                       R

G =Green, Y =Green+Red, R =Red

- Enter a selection number to go to that screen.
- Press the "Space" key to refresh the screen.
- Press the "Enter" key to go back to the previous page.
```

The detailed *SFP* information may be viewed by entering "1" for *SFP* A or "2" for *SFP* B. Displayed data includes the manufacturer name, code, part number and revision number. These values may not be modified.

For *SFP* modules that support *DDMI* values for temperature, voltage, diode current and optical receive/transmit, levels can be obtained through *SNMP* Management Module.

Ethernet Port Configuration Screen

The screen displays the current values for items 1 through 11 for both the Host and Remote site.

```
iMcV-T1-MUX/4(Host)                                          Version: 01.00
Unit Name: Host                                              Time: 12:08:39

                  Ethernet Port Configuration

1) Port Name Host:   Host Ethernet Port
2) Port Name Remote: Remote Ethernet Port

                          HOST            REMOTE
                         --------        ---------
3) Port Enable:          Enabled         Enabled
4) Speed & Duplex:       Auto_Neg        Auto_Neg
5) Advertise FlowCtrl:   Enabled         Enabled
6) Advertise SpdDpx:     Adv_All         Adv_All
7) Force FlowCtrl:       Disabled        Disabled
8) Link Fault PassThru:  Disabled        Disabled
9) FX LinkLoss:          Enabled         Enabled
10)Fiber Fault Loopback:Disabled         Disabled
11)BandWidth Contol

- Enter a selection number to go to that screen.
- Press the "Space" key to refresh the screen.
- Press the "Enter" key to go back to the previous page.
>
```

Enter the number of the menu item to change its configuration, and then enter the new value(s) when prompted.

Ethernet Port Status Screen

This screen displays the current Ethernet port status for both the Host and Remote site.

```
iMcV-T1-MUX/4(Host)                                          Version: 01.00
Unit Name: Host                                              Time: 12:09:25

                    Ethernet Port Status

                    Host         Remote
                  --------      --------
Link Up Status:     N             N
Speed:              10            10
Full Duplex:        N             N

- Press the "Space" key to refresh the screen.
- Press the "Enter" key to go back to the previous page.
```

T1 Port Configuration Screen

Use this screen to access the loopback and name details for each of the four T1 ports.

```
iMcV-T1-MUX/4(Host)                                          Version: 01.00
Unit Name: Host                                              Time: 12:10:02

                    T1 Port Configuration

 1) T1 Port 1 LoopBack: None
 2) T1 Port 2 LoopBack: None
 3) T1 Port 3 LoopBack: None
 4) T1 Port 4 LoopBack: None
 5) Host   T1 Port 1 Setup
 6) Host   T1 Port 2 Setup
 7) Host   T1 Port 3 Setup
 8) Host   T1 Port 4 Setup
 9) Remote T1 Port 1 Setup
10) Remote T1 Port 2 Setup
11) Remote T1 Port 3 Setup
12) Remote T1 Port 4 Setup

- Enter a selection number for new configuration.
- Press the "Space" key to refresh the screen.
- Press the "Enter" key to go back to the previous page.


>_
```

Enter the number of the menu item to edit, and enter the new value(s) when prompted.

Host T1 Port Setup Screen

Enter the number of the menu item to edit, and enter the new value(s) when prompted.

```
iMcV-T1-MUX/4(Host)                                          Version: 01.00
Unit Name: Host                                              Time: 12:01:47

              Host T1 Port 2 Setup
              (Equipped, 133ft, B8ZS)

 1) Port Name:     IMC
 2) Port State:    Equipped
 3) Port State:    Not-Equipped
 4) Line Buildout: 0   to 133 ft
 5) Line Buildout: 133 to 265 ft
 6) Line Buildout: 265 to 399 ft
 7) Line Buildout: 399 to 533 ft
 8) Line Buildout: 533 to 655 ft
 9) Line Code:     AMI
10) Line Code:     B8ZS

- Enter a selection number for new configuration.
- Press the "Space" key to refresh the screen.
- Press the "Enter" key to go back to the previous page.
```

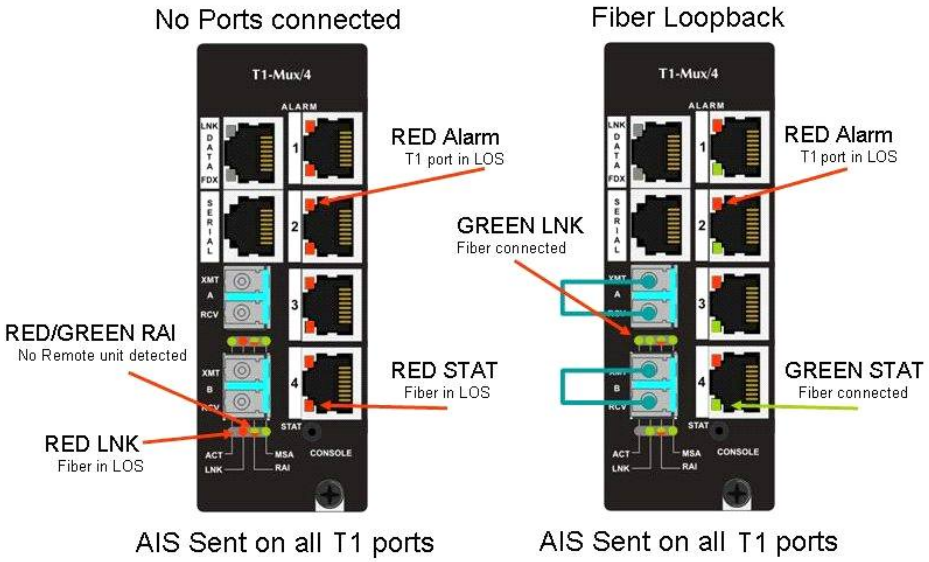
T1 Port Status Screen

Use this screen to display the current status for each of the four T1 ports for the Host and Remote units.

```
iMcV-T1-MUX/4(Host)                                          Version: 01.00
Unit Name: Host                                              Time: 12:10:36

                       T1 Port Status

              Host LEDs              Remote LEDs
             -------------          -------------
            Alarm   Status         Alarm   Status
T1 Port1:
T1 Port2:
T1 Port3:     R       Y              R       Y
T1 Port4:     R       Y              R       Y
G =Green, Y =Green+Red, R =Red

- Press the "Space" key to refresh the screen.
- Press the "Enter" key to go back to the previous page.
```

Fiber Optic Port Verification

As a troubleshooting aid, the fiber optic ports can be verified by placing a physical loopback optical line on the ports and verify the *LED* behavior as shown:

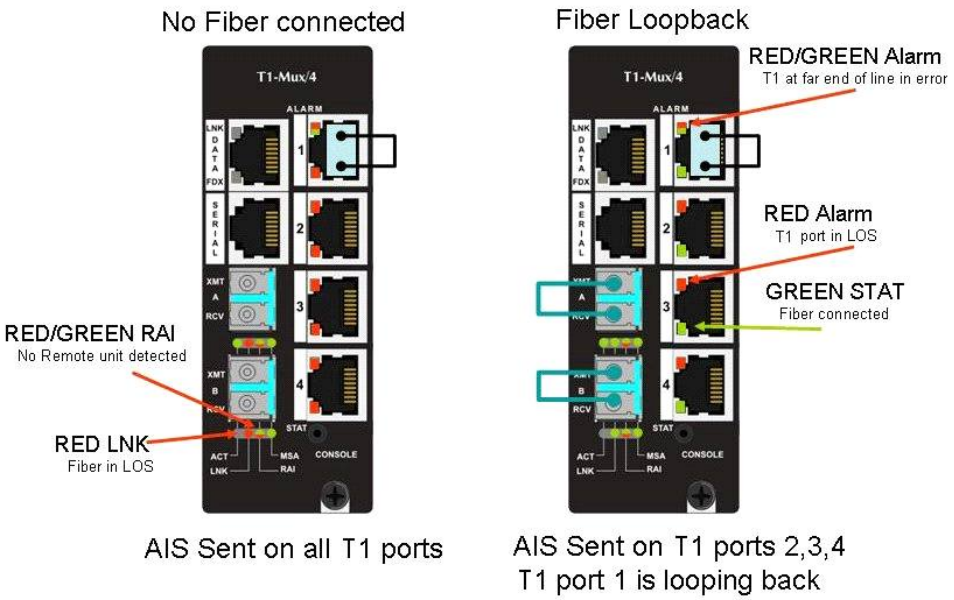


The ACT *LED* will arbitrarily be configured to either the A or B fiber line. The *RAI LED* is RED/GREEN indicating that there is something wrong at the far end of the fiber line (in this case, the remote unit is missing). The ALARM LED is RED because the T1 port is not connected. The STAT LED is RED when there is no fiber link but turns GREEN when the fiber link is valid.

NOTE
The T1 ports are all sending AIS. *However, with the fiber looped, it is because of the* LOS *on the T1 port. Without the fiber looped, it is because of the* LOS *of the fiber port.*

WARNING
An optical loopback will also loop back the Ethernet port. If the network cannot tolerate this, remove the Ethernet port connection before connecting the fiber loopback.

T1 Port Verification

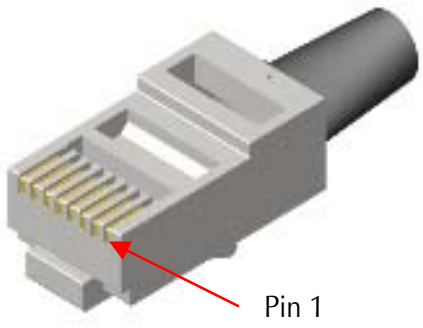


By placing a physical loopback connection on the T1 port, a valid signal can be detected by each individual T1 port to verify its operation. Without the fiber looped, the ALARM *LED* for the looped T1 port will show RED/GREEN indicating there is a problem at the far end of the fiber transport (In this case the far end unit is missing) and the STAT LED is RED because the fiber is in LOS. With the fiber looped, the T1 port will only show a normal GREEN STAT LED.

10/100BaseT Ethernet Mating Connector Pinout

The following table lists the pin configuration for the standard RJ-45 Ethernet connector.

Pin	Signal
1	*Transmit +*
2	*Transmit -*
3	*Receive +*
4	*None*
5	*None*
6	*Receive -*
7	*None*
8	*None*

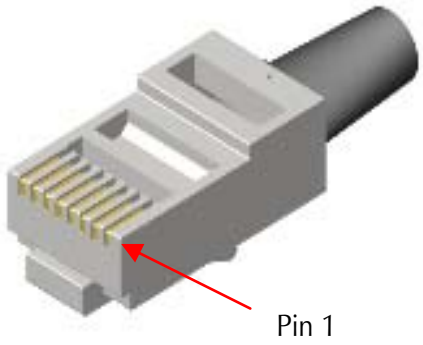


NOTE
MDI/MDIX AutoCross function will automatically transpose the Transmit and Receive lines if required.

T1 Port Mating Connector Pinout

The following table lists the pin configuration for the standard RJ-48 T1 port mating connectors.

Pin	Signal
1	*Receive 1 (Tip in to unit)*
2	*Receive 2 (Ring in to unit)*
3	*None*
4	*Transmit 1 (Tip from unit)*
5	*Transmit 2 (Ring from unit)*
6	*None*
7	*None*
8	*None*

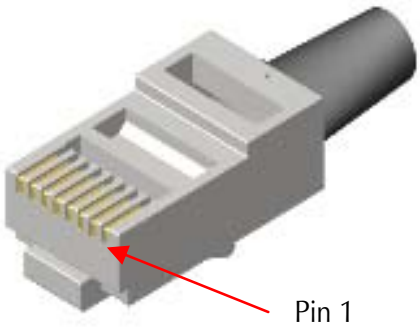


NOTE
The pin configuration is consistent with a DTE interface.

RS-232 Port Mating Connector Pinout

The following table lists the pin configuration for the RS-232 port mating connector.

Pin	Signal
1	*None*
2	*None*
3	*None*
4	*Signal Ground*
5	*Receive Data (in to unit)*
6	*Transmit Data (out of unit)*
7	*None*
8	*None*



This port provides an end-to-end RS-232 line that can support up to 120K Baud and is transparent to all RS-232 protocols.

RS-232 Serial Console Port

The following table lists the pin configuration for the RS-232 3-pin Mini Jack mating connector for the console serial port.

Pin	DB9-F Pin#	Signal Name	Direction
Tip	2	Transmit	Out of Unit
Ring	3	Receive	In to Unit
Sleeve	5	Return	Return

- All IE-iMcV-T1-Mux/4 + Ethernet units are shipped configured as Host units via DIP Switch #1 = OFF. The Remote unit should be set to DIP Switch #1 = ON. Be sure to confirm that the iMcV-T1-Mux/4 card is set correctly when used.
- The fiber transport is independent of all other ports and should be established first. If this is not possible, a physical fiber loopback can be used for fiber port verification. A fiber loopback will cause all connected ports to loop back their respected data.
- If the fiber is not connected, all T1 ports will send the all-ones, *AIS* signal. This can be physically looped back to verify T1 port operation.
- When a replacement module is added into the same slot of the chassis, the SNMP managed configuration may become lost or incomplete. To avoid this situation, wait at least two minutes between removing the old module and inserting the new module.

Specifications

Power Consumption (Typical):
0.96A @ +5 VDC

Operating Temperature:
+32°F to +158°F (0°C to +70°C)

Storage Temperature:
-40°F to +158°F (-40°C to +70°C)

Humidity:
5% to 95% (non-condensing)

Dimensions:
Dual Slot iMcV module

MTU:
Maximum packet size up to 1916 bytes

Standards/Compliance

- IEEE 802.3x Flow Control
- IEEE 802.3i 10Base-T twisted pair
- IEEE 802.3u 100Base-TX twisted pair
- IEEE 802.3u 100Base-FX or SX fiber
- ITU G.703
- ITU G.775
- ITU G.824
- GR-820-CORE

Definition of Terms/Acronyms

The following are terms and phrases used within this manual, or which are found in documents associated with this equipment.

1+1	The Term "1+1" refers to line protection where identical information is transmitted on two redundant lines. The Receiver chooses the "best" line to use based on the BER of the line.
AIS	Alarm Indication Signal: Used in T1 signaling, the AIS is a predetermined bit stream (all ones) that is transmitted (forwarded) upon the loss of an incoming T1 signal or when the T1 signal is disrupted.
AMI	Alternate Mark Inversion: A bipolar coding scheme used to accommodate the ones density requirements of T1 lines in such a way that successive ones, or marks, must alternate in polarity. AMI is an older standard, but is still used for transporting voice transmissions.
AN	Auto Negotiation: A signaling protocol used by an Ethernet PHY to determine the characteristics (speed, duplex mode) of its "link partner" and configure itself automatically
B8ZS	Bipolar with 8-Zero Substitution: A line code used for T1 which converts any string of 8 zeros of a DS-1 signal into a code which at the far end is converted back to eight zeros. B8ZS coding actually inserts Bipolar Violations (BPVs) that are realized at the next multiplexer point and are taken out of the signal.
BER	Bit Error Rate: The percentage of bits with errors divided by the total number of bits that have been transmitted, received or processed over a one second time period.
CLI	Command Line Interface: An interface screen, often DOS-based, used for system management and diagnostics requiring the user to type commands rather than use a *GUI*.
CV	Code Violation: An anomaly of a decoded physical-layer signal stream resulting in coding (signaling) error(s). Noise bursts or intermittent connections on a link are the usual causes of code violations; an *HDB3* coding error.
DDMI	Digital Diagnostic Monitor Interface: A defined serial interface and data format typically used to access SFP internal information

FFL	Fiber Fault Loopback: When the fiber line fails, the Ethernet port that is being forwarded over the fiber line is forced out of LINK. Similar to the Fiber Alert function.
GUI	Graphical User Interface: Software that provides a visual interface to enable an end-user to manage and monitor network devices.
IS	In-Service stat is the normal state of an active port with normal error reporting.
LED	Light Emitting Diode: A small stack of lights to indicate link, duplex or other options.
LFPT	Link Fault Pass-Through: LFPT can be enabled via iView^2 or through the console port.
LOF	Loss Of Frame: An error condition where the receiver/decoder misses detection of the framing signal.
LOS	Loss Of Signal: An error condition where the receiving line interface unit does not detect a signal.
MDI/MDIX	Media-Dependent Interface/ Media-Dependent Interface Crossover. The ability of an Ethernet port to automatically detect and configure its cabling connections to accommodate crossover or non-crossover wiring, depending on its link partner and cabling.
MIB	Management Information Base: A database of objects that can be monitored by a network management system. Both SNMP and RMON use standardized MIB formats that allow any SNMP and RMON tools to monitor any device defined by a MIB.
MSA	Multi-Source Agreement (SFP): The standard an SFP must meet to be compatible in network devices.
NOC	Network Operations and Control Center
OOS	Out-Of-Service, OOS is used by the CRAFT personnel to turn OFF the alarm reporting so they can service the line without causing alarm TRAPS to be sent to the NOC Center. The LEDs display a line status but do not report any line related alarms back to the NOC. A card removal or insertion is still reported, but a PORT up/down or changes to its configuration are not.
POP	Point(s) Of Presence: The demarcation point where carrier owned equipment is located at the customer site.

RAI	Remote Alarm Indication: Status information received from the line indicating there is an alarm condition at the far end of the transport.
SFP	Small Form-Factor Pluggable: An industry standard optical pluggable module.
SNMP	Simple Network Management Protocol: A set of protocols for managing complex networks over a standards-based IP network.

IMC Networks Technical Support

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Web: www.imcnetworks.com

Fiber Optic Cleaning Guidelines

Fiber Optic transmitters and receivers are extremely susceptible to contamination by particles of dirt or dust, which can obstruct the optic path and cause performance degradation. Good system performance requires clean optics and connector ferrules.

1. Use fiber patch cords (or connectors, as appropriate) only from a reputable supplier; low-quality components can cause many hard-to-diagnose problems in an installation.
2. Dust caps are installed at IMC Networks to ensure factory-clean optical devices. These protective caps should not be removed until the moment of connecting the fiber cable to the device. Should it be necessary to disconnect the fiber device, reinstall the protective dust caps.
3. Store spare caps in a dust-free environment such as a sealed plastic bag or box so that when reinstalled they do not introduce any contamination to the optics.
4. If it is suspected that the optics have been contaminated, alternate between blasting with clean, dry, compressed air and flushing with methanol to remove particles of dirt.

Electrostatic Discharge Precautions

Electrostatic discharge (ESD) can cause damage to any product, add-in modules or stand alone units containing electronic components. Always observe the following precautions when installing or handling these kinds of products

1. Do not remove unit from its protective packaging until ready to install.
2. Wear an ESD wrist grounding strap before handling any module or component. If the wrist strap is not available, maintain grounded contact with the system unit throughout any procedure requiring ESD protection.
3. Hold the units by the edges; do not touch the electronic components or gold connectors.
4. After removal, always place the boards on a grounded, static-free surface, ESD pad or in a proper ESD bag. Do not slide the modules or stand alone units over any surface.

WARNING! Integrated circuits and fiber optic components are extremely susceptible to electrostatic discharge damage. Do not handle these components directly unless you are a qualified service technician and use tools and techniques that conform to accepted industry practices.

CE: The products described herein comply with the Council Directive on Electromagnetic Compatibility (2004/108/EC).

European Directive 2002/96/EC (WEEE) requires that any equipment that bears this symbol on product or packaging must not be disposed of with unsorted municipal waste. This symbol indicates that the equipment should be disposed of separately from regular household waste. It is the consumer's responsibility to dispose of this and all equipment so marked through designated collection facilities appointed by government or local authorities. Following these steps through proper disposal and recycling will help prevent potential negative consequences to the environment and human health. For more detailed information about proper disposal, please contact local authorities, waste disposal services, or the point of purchase for this equipment.

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